

Original claims 1-21 as filed in U.S. Application Serial No. 298,104, filed August 30, 1994, now U.S. Patent 5,537,157.

WHAT IS CLAIMED IS:

1. A multi-format audio/video production system adapted for use with a display device, comprising:

means to receive an input signal representative of an audio/video program in one of a plurality of formats;

a graphics processor connected to receive the input signal, the graphics processor including:

a standard/widescreen interface unit operative to convert the video program in the input format into an out signal representative of a standard/widescreen formatted image, and

a high-definition television interface unit operative to convert the video program in the input format into an output signal representative of an HDTV-formatted image;

an operator interface; and

a centralized controller in operative communication with the means to receive a video program, the graphics processor, and the operator interface, whereby command entered by an operator cause the graphics processor to perform one or more of the conversions using the standard/widescreen and high-definition television interfaces.

2. The multi-format audio/video production system of claim 1, the graphics processor operative to convert the video program in the input format into an output signal for photographic production.

3. The multi-format audio/video production system of claim 1 wherein the input and output signals may be compatible with any of the following standard formats; RGB, YIQ, YUV, and Y/R-Y/B-Y.

4. The multi-format audio/video production system of claim 1 wherein the input and output signals may be compatible a video standard utilizing separate luminance and chrominance component video signals.

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5. The multi-format audio/video production system of claim 1, wherein the means to receive an input signal representative of a video program includes a digital video camera including:

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a plurality of charge-coupled-device image sensors;

an analog-to-digital converter circuit connected to the output of each image sensor to generate a digital signal representative of the sensed image; and

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a digital signal processor configured to receive the digital signal from each analog-to-digital converter circuit and generate a digital video output signal in predetermined input format for processing by an interface unit of the graphics processor.

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6. The multi-format audio/video production system of claim 5, wherein the digital video camera uses two charge-coupled-device image sensors, one associated with luminance, the other associated with chrominance.

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7. The multi-format audio/video production system of claim 1 wherein the means to receive a video program includes a removable high-capacity magnetic storage medium.

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8. The multi-format audio/video production system of claim 1 wherein the graphics processor is operative to crop the video program in the first format into format having a different aspect ratio, the extent of the cropping being visibly evident on the display device.

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9. The multi-format audio/video production system of claim 1 wherein the video program in the first format includes 24 frame-per-second images, the graphics processor further being operative to convert the 24-frame-per-second images into

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1 a 30 frame-per-second NTSC-compatible format.

10. The multi-format audio/video production system of  
claim 1 wherein the video program in the first format includes  
5 24 frame-per-second images, the graphics processor further  
being operative to convert the 24 frame-per-second images into  
a 25 frame-per-second PAL/SECAM compatible format.

11. The multi-format audio/video production system of  
10 claim 1 wherein the video program in the first format includes  
24 frame-per-second images, the graphics processor further  
being operative to convert the 24 frame-per-second images into  
an HDTV-compatible format.

12. The multi-format audio/video production system of  
15 claim 1, where the HDTV interface further provides means for  
reducing the chrominance bandwidth of an RGB video signal  
without reducing its luminance bandwidth, comprising:

three low-pass filters, one associated with each of the  
20 R, G, and B signals to remove all frequency components above a  
specified frequency;

an RGB-to-Y matrix circuit connected to receive each of  
the R, G, and B signals, the RGB-to-Y matrix circuit being  
operative to combine the signals in predetermined proportions  
25 and produce a single luminance signal, Y;

a high-pass filter connected to the output of the RGB-to-  
Y matrix circuit to filter the Y signal to remove all  
frequency components below a specified frequency;

a Y-to-RGB matrix circuit connected to the output of the  
30 high-pass filter, the Y-to-RGB matrix circuit being operative  
to separate the high-pass-filtered Y signal into R', G', and  
B' signals in the same proportion as previously combined by  
the RCB-to-Y matrix circuit of the three R-R', G-G', and B-B'  
pairs, each mixer being operative to mix the signals of its

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1        respective input pairs and generate R", G" and B" signals  
having full luminance bandwidth and reduced chrominance  
bandwidth.

5            13. A multi-format audio/video production system forming  
part of a general-purpose computer platform having a user  
input and color display, the system comprising:

          means to receive an input video program;

          means to convert the input program into a 24 frames-per-  
10        second (fps) production format, if necessary, according to one  
of the following aspect ratios for review on the color  
display:

          1024 x 576 pixels, 1024 x 768 pixels, 1280 x 720 pixels,  
and 1280 x 960 pixels; and

15            means to convert the production version into one or more  
of the following output formats:

          NTSC at 30 fps, PAL/SECAM at 25 fps, HDTV at 25 fps, HDTV  
at 30 fps, and

          film-compatible video at 24 fps.

20            14. The multi-format audio/video production system of  
claim 13 wherein the means to convert the production version  
into one or more of the output formats includes interpolation  
means to expand the number of pixels associated with the  
25        production format.

          15. The multi-format audio/video production system of  
claim 13 wherein the means to convert the production version  
into one or more of the output formats includes image  
30        sequencing means to convert the 24 fps production format into  
a 30 fps output format.

          16. The multi-format audio video production system of  
claim 13 wherein the means to convert the production version  
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1       into one or more of the output formats includes means to  
increase the frame rate from the 24 fps production rate to a  
25 fps output rate.

5           17. In an enhanced personal computer having a color  
monitor, the method of producing a video program, comprising  
the steps of:

receiving an input video program;

10       converting the input video program into a production  
format having a frame rate of 24 frames per second and one of  
the following dimensions in pixels:

1024 x 576   1024 x 768   1280 x 720   1280 x 960;

15       displaying the video program on the color monitor in one  
of the pixel dimensions, including cropped versions of the  
program wherein the extent of the cropping is visually evident  
on the monitor;

manipulating the video program to create a desired edited  
version of the program in a final format which may have a  
frame rate and pixel dimensions different from that of the  
20       production format; and

outputting the desire edited version of the program in  
the final format.

25       18. The method of claim 17, wherein the step of  
manipulating the video program to create a desire edited  
version of the program in a final format includes using an  
image sequencing technique to convert from the production  
format at 24 frames per second to produce an edited version of  
the program in a final format at 30 frames per second.

30       19. The method of claim 17, wherein the step of  
manipulating the video program to create a desired edited  
version of the program in a final format includes the step of  
interpolating to produce an edited version of the program in a

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1 final format having pixel dimensions greater than that of the  
production format.

5 20. The method of claim 17, wherein the step of  
manipulating the video program to create a desire edited  
version of the program in a final format includes the step of  
increasing frame rate to produce an edited version of the  
program in a final format having a 24 frame-per-second rate.

10 21. In a video production system wherein a video program  
is represented in RGB form, the method of reducing the  
chrominance bandwidth of the RGB signal without reducing its  
luninance bandwidth, comprising the steps of:

receiving the R, G, and B signals;  
15 low-pass filtering each of the R, G, and B signals to  
remove all frequency components above a specified frequency,  
resulting in R', G' and B' signals;

matrixing the R, G, and B signals in a predetermined  
proportion;

20 high-pass-filtering the matrixed signal to remove all  
frequency components below a specified frequency;

symmetrically separating the high-pass-filtered matrixed  
signal into R, G, and B components in a predetermined  
proportion;

25 mixing each of the R', G', and B' signals with each of  
the R, G, and B components, respectively, to produce an output  
set of R, G, and B signals, each having a full luminance  
bandwidth but reduced chrominance bandwidth.

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